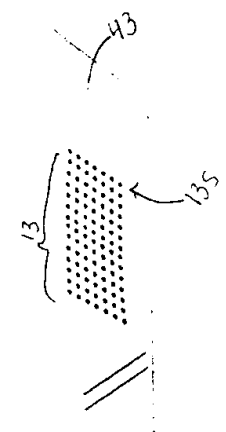
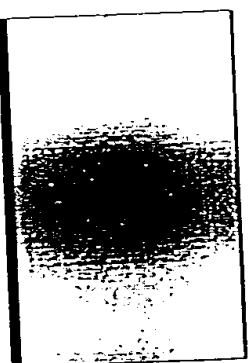


FIG. 1A

Validation - phase I



- verification of initial ---
- screening results
- establish cellular -----
- localization & anatomic
- distribution

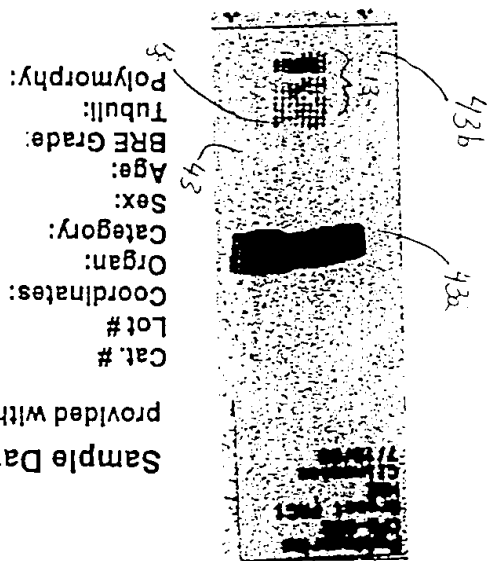


50-200
series basic
arrays

FIG. 1B

FIG 2E

#16. 2D



Cat. #	BR50	Lot #	07	Coordinates:	A1a	Mitoses:	1	PT:	1	PN:	0	LN pos	0	LN all	23	Tumor dia.	15	mastectomy	3	Surgery:	3	Tubuli:	3	BRE Grade:	G2	Age:	67	Sex:	F	Category:	Breast cancer, ductal	Organ:	Breast	Polymorphy:	3
--------	------	-------	----	--------------	-----	----------	---	-----	---	-----	---	--------	---	--------	----	------------	----	------------	---	----------	---	---------	---	------------	----	------	----	------	---	-----------	-----------------------	--------	--------	-------------	---

Sample Data Sheet Information (for one tissue element, located at A1a)
provided with every pathWorks™ Tissue MicroArray

FIG. 2C

Six tissue elements from a PathWork™ Breast Array BR50 stained with CK7 showing selective staining (400X). Tissue elements are 0.6mm in diameter and spaced 0.3mm apart.

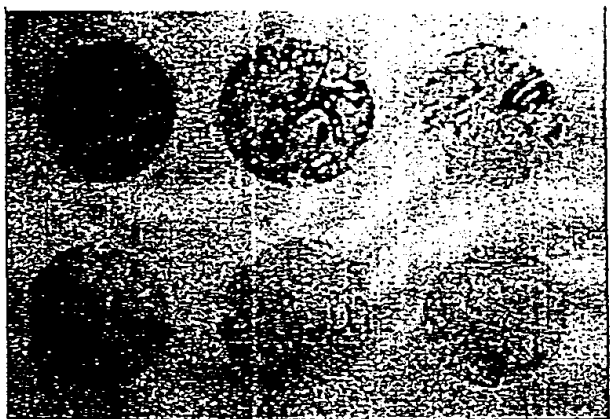


Fig. 2B

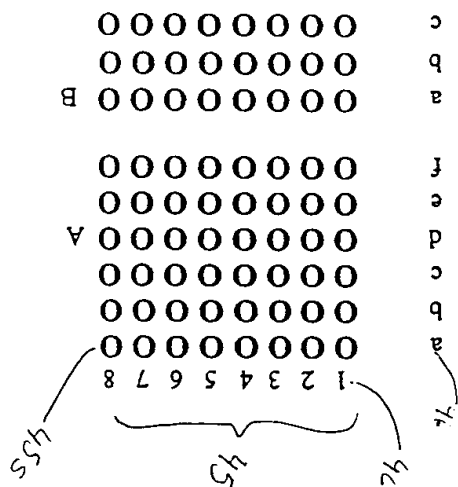
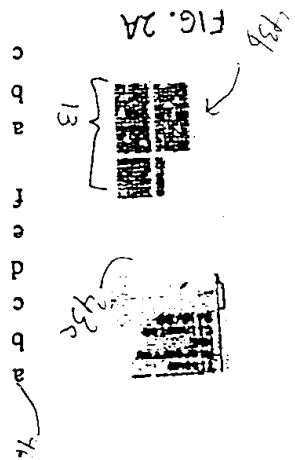
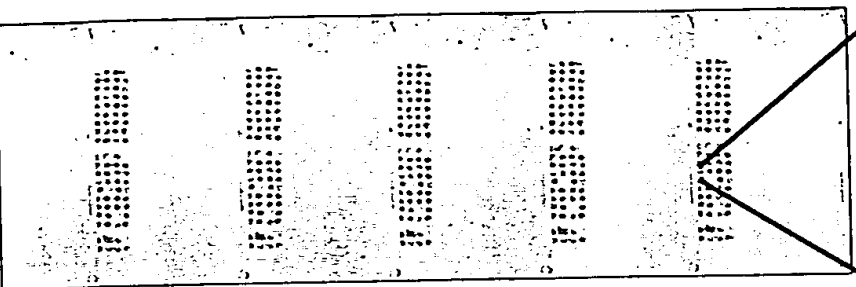
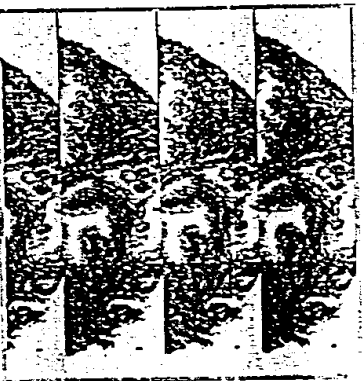


FIG. 2A



Tissue MicroArrays



- Development of population databases
- High-throughput in situ analysis of DNA, RNA and protein
- Discovery of diagnostic and prognostic correlations
- Target prioritization

The Clinomics Biorepository

Clinomics Biorepository Application - (ItemSpecimenEntry: Form)

File Edit View Insert Format Records Tools Window Help

Standard toolbar icons: New, Open, Save, Print, Find, etc.

Window control buttons: Minimize, Maximize, Close

Specimen Entry Form

Pathology # Lookup Pathology # H-983-90

Patient Data | Diagnosis | History | Specimen Data

Collection Date	Age at Collection	Received Date	Received Tech	Specimen Type	Amount
6/19/1990	83	10/15/1990	CU	Issue	block
Medication	Can Medication	Metastasis Site	Biendence	Treatment	TNM Staging
CMF	Taxol	Lung	Biopsy	Chemotherapy	T1N1M1U
Chemotherapy	Chemo Date	Radiation Therapy	Radiation Date	Node Status	Surgical Biopsy
Yes	8/20/1990	Yes	7/15/1990	Positive	Yes
Primary Site	Tubal Type	Surgical Resection			
Breast (I)	Conical	Yes			

Add New Pathology
Delete Existing Pathology
Save Record

Clinical ID	Description	Location	Sample Type	Amount	Quota #
000002841		TPA, A. tubes	FFPE	block	0
000007489	Breast cancer	TPA, A. tubes	S	100 mg/l	0
000007491	Breast cancer	TPA, B. bags	FFPE	100 Mg	0
000007492	Breast cancer	TPA, B. bags	FFPE	100 mg	0
000007493	Breast cancer	TPA, A. tubes	FFPE	100 mg	0
000007494	Breast cancer	TPA, A. tubes	FFPE	100 mg	0

Sample Data

Record: 14 of 4771

Form View

Start | American | CD Pa. | HP 69. | Clinom.

NUM 4:18 PM

CLINOMICS

FIG. 4A

Biorepository Database

coordinates on array	histology	BR grade	tumor diameter	pT	pN	nodes examined	nodes pos	censor	mrtts	survival	age	hormtherapy	chemotherapy	neopdendn
	ductal	1						0		58	33			
	ductal	1	90	3	1	40	28	0		78	43	no	yes	no
	ductal	2	60	3	2	10	6	0		29	54	yes	no	no
	ductal	1	20	1	0	8	0	0		96	55	no	no	no
	ductal	1	30	4	1	9	2	0		64	70	yes	no	no
	ductal	1	30	4	1	14	8	0		43	44	no	yes	no
	ductal	1	10	1	1	11	2	0		12	51			
	ductal	3	22	2	1	16	3	0		107	64	yes	no	no
	ductal	3	30	2	3	4	4	0		21	48			
	ductal	3		3	2			0		28	49			
	ductal	2	40	2	1	13	5	0		55	69			
	ductal	1	40	2	2	12	9	0		73	44			
	ductal	2	30	4	2	10	7	0		85	70			
	ductal	3	30	4	0	14	0	0		80	79	no	no	no

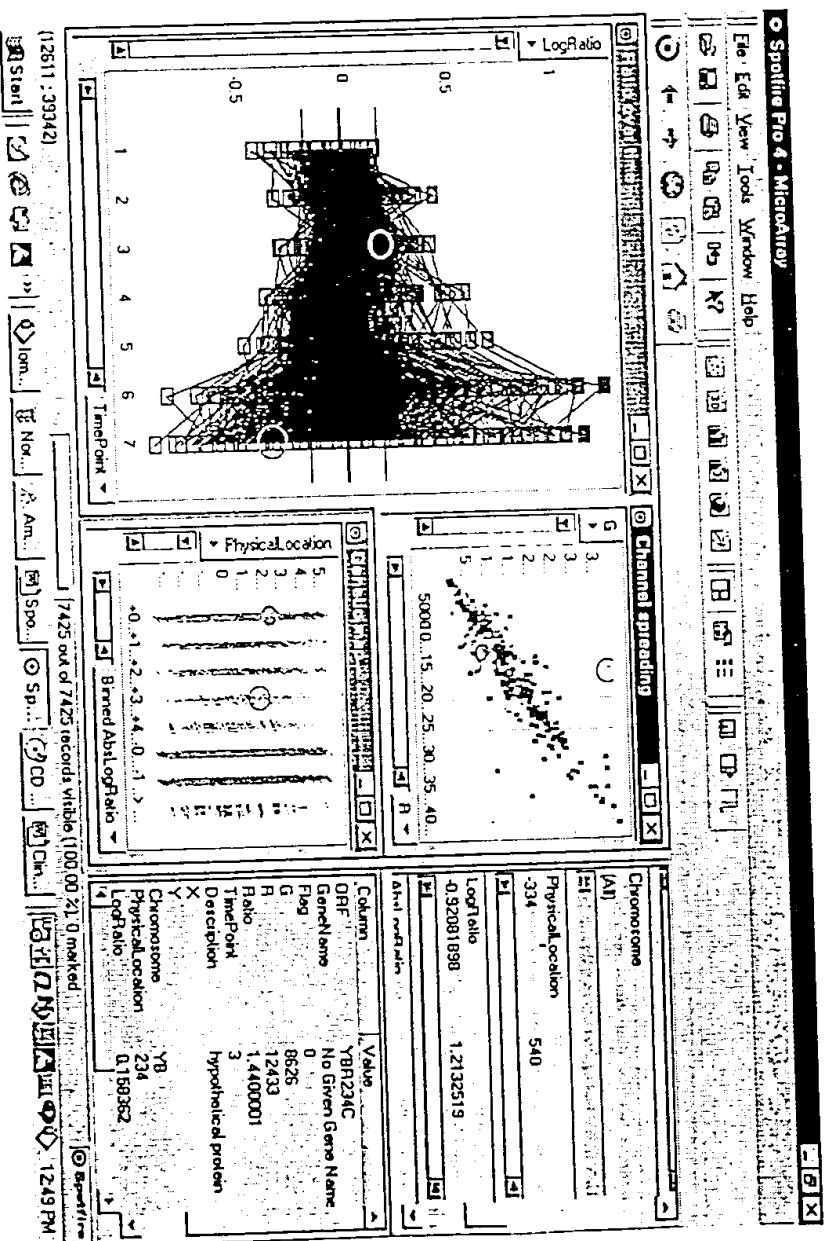
Medication and treatment histories, with outcomes, and expression profiles

FIG. 4B

CLINOMICS

Biorepository Database

- Sorting and selection of patient populations
- Clustering analysis
- Development of expression profiles vs. medical data



Clustering analysis

FIG. 4C

CLINOMICS

FIGURE 5

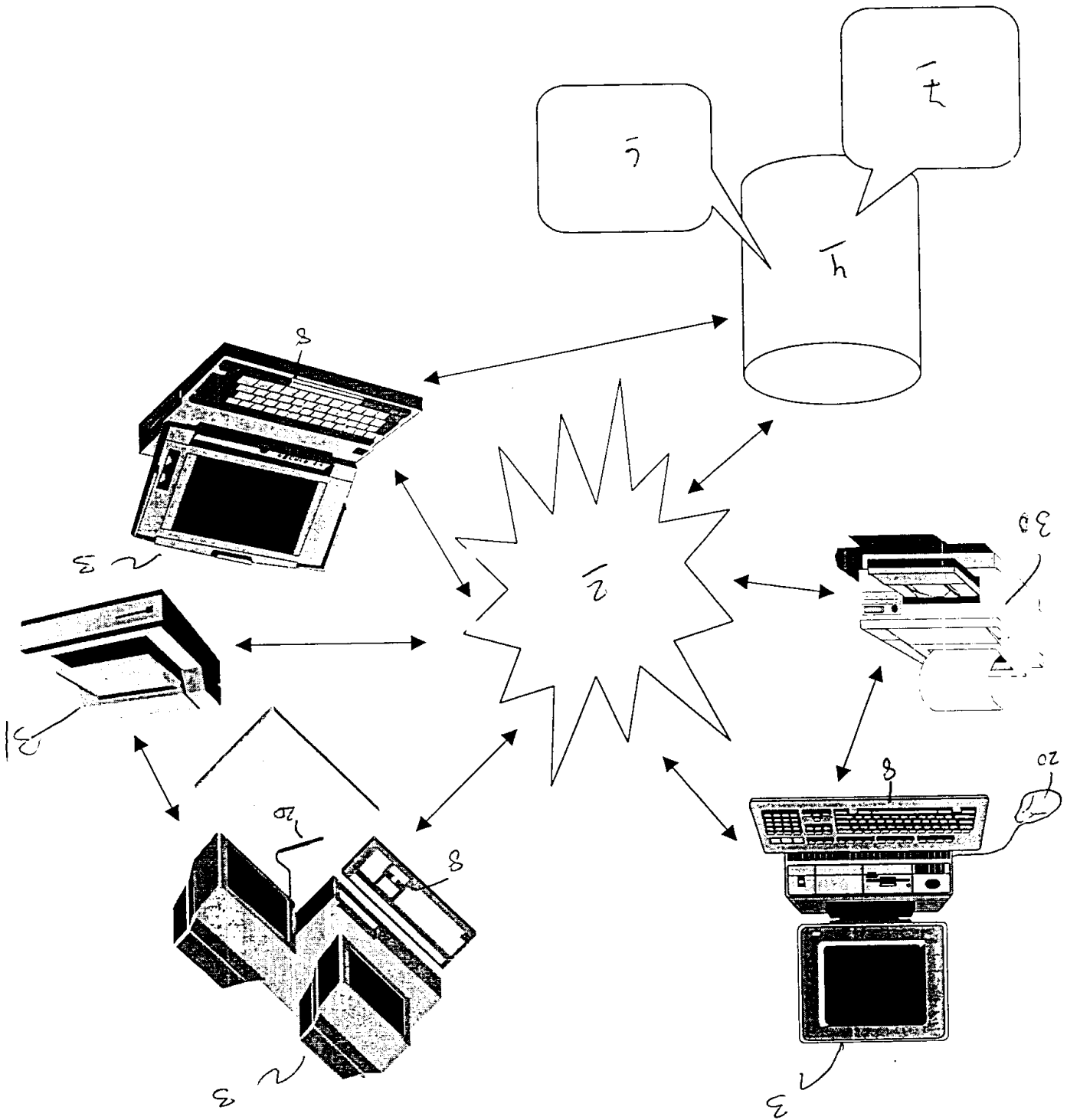
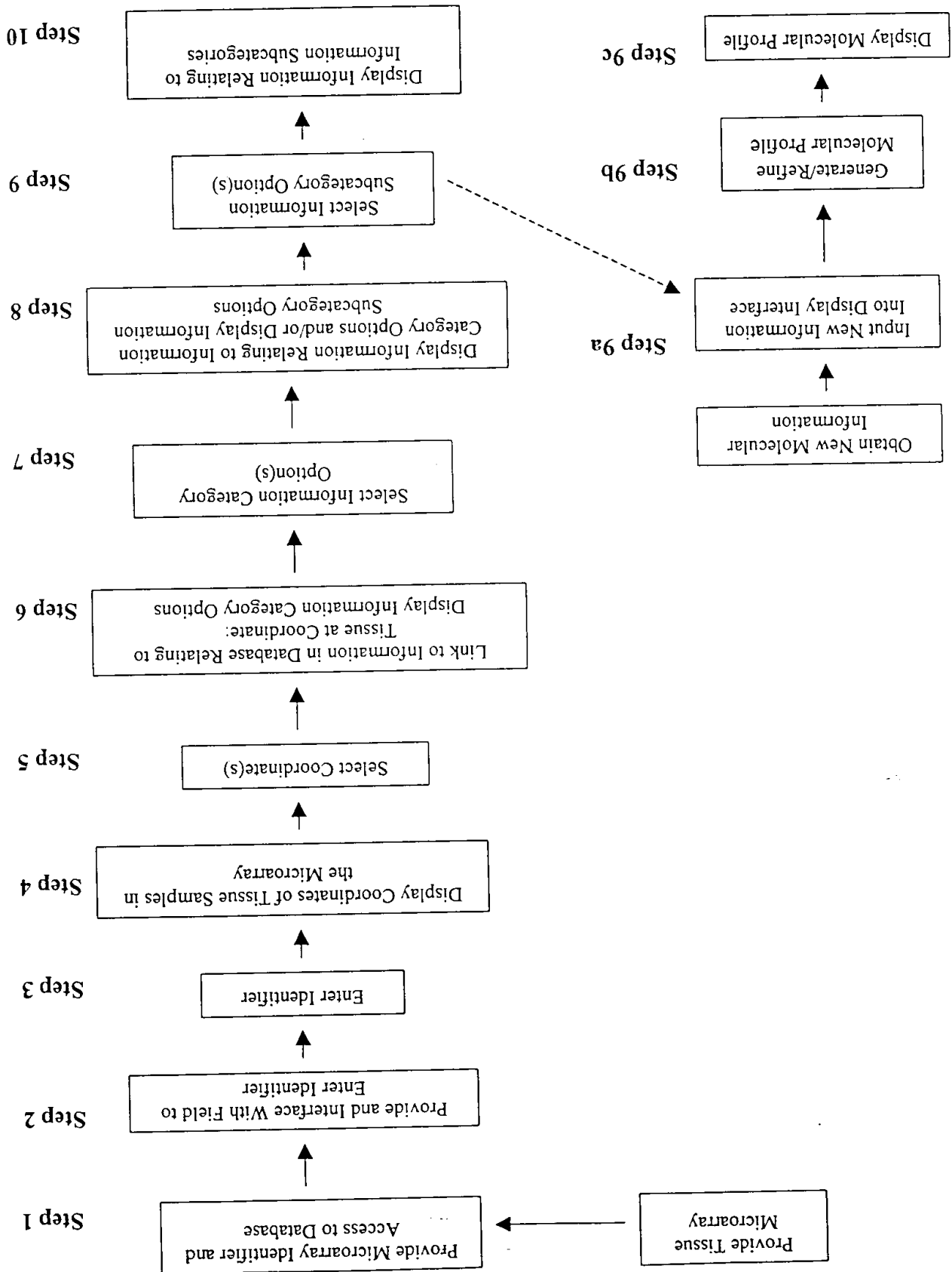


FIG. 6



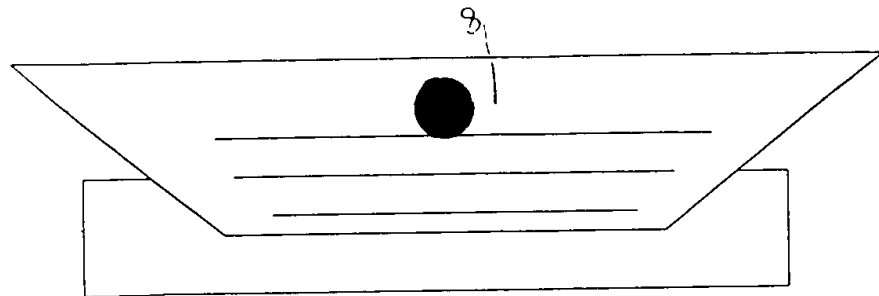


FIG. 7D

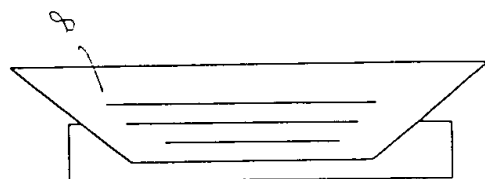


FIG. 7E

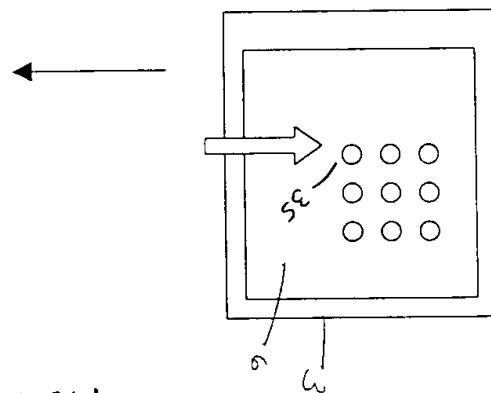
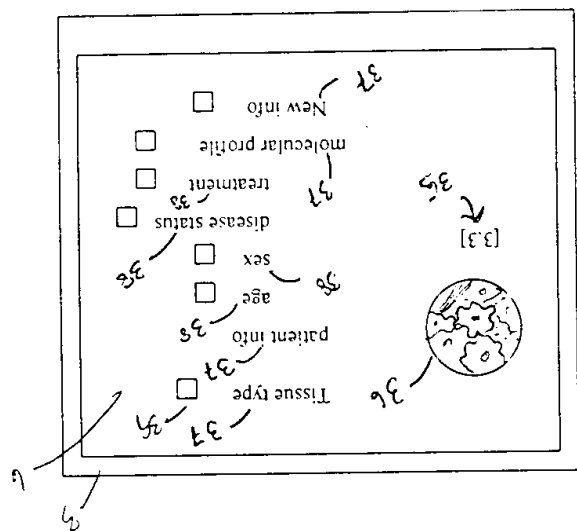


FIG. 7G

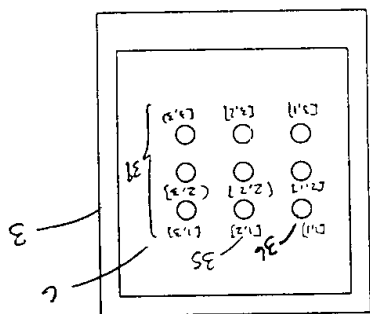


FIG. 7B

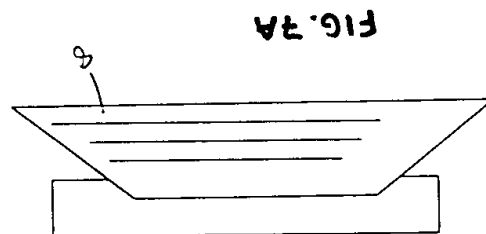
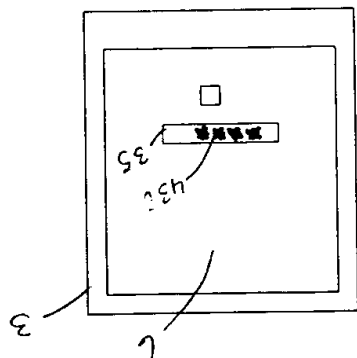
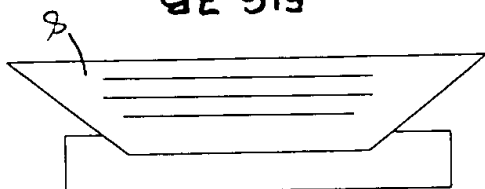


FIG. 7A

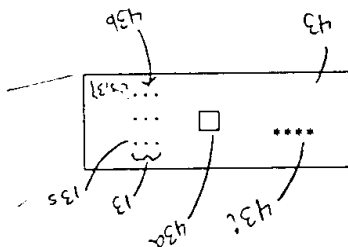
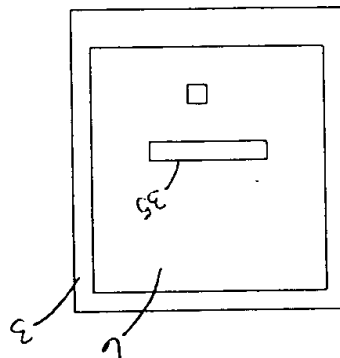


FIG. 7G

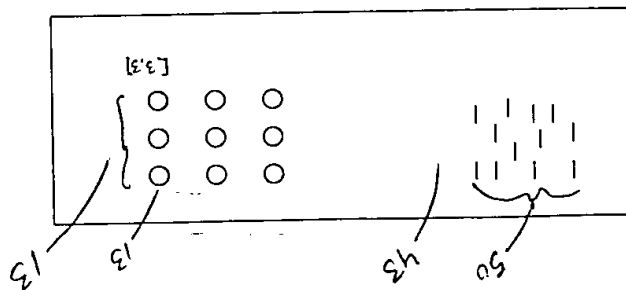
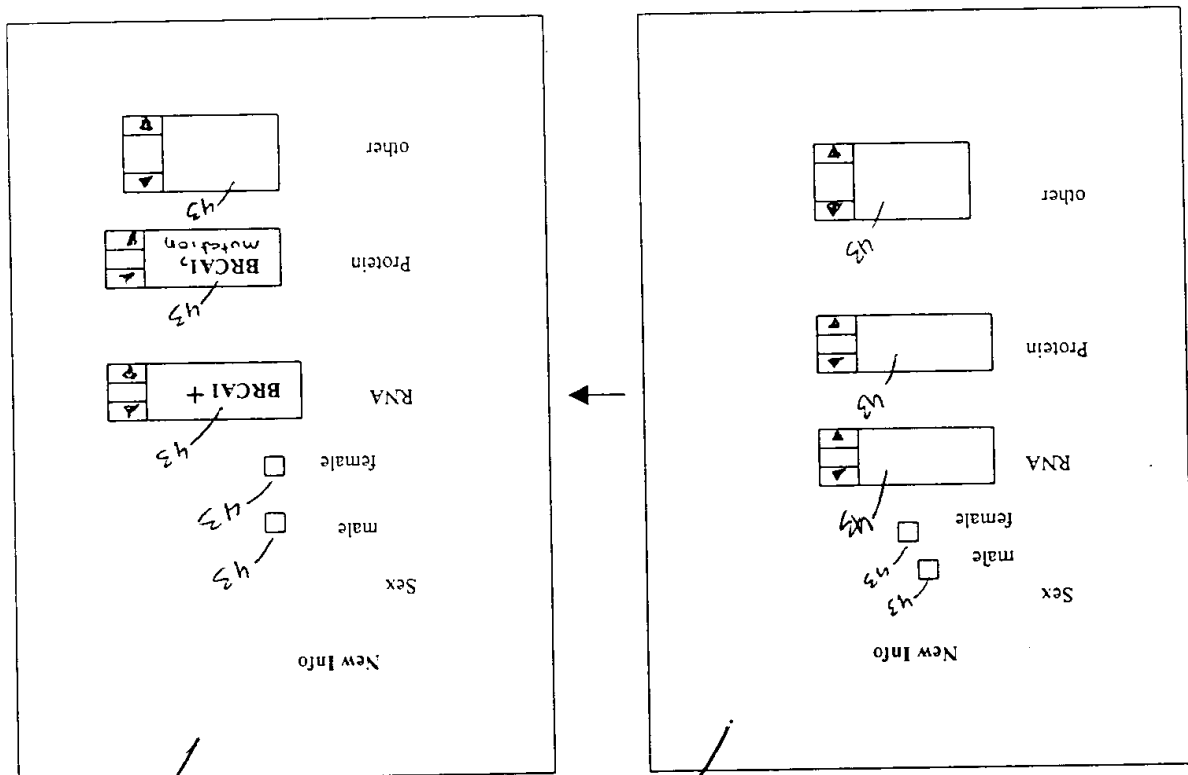


FIGURE 8

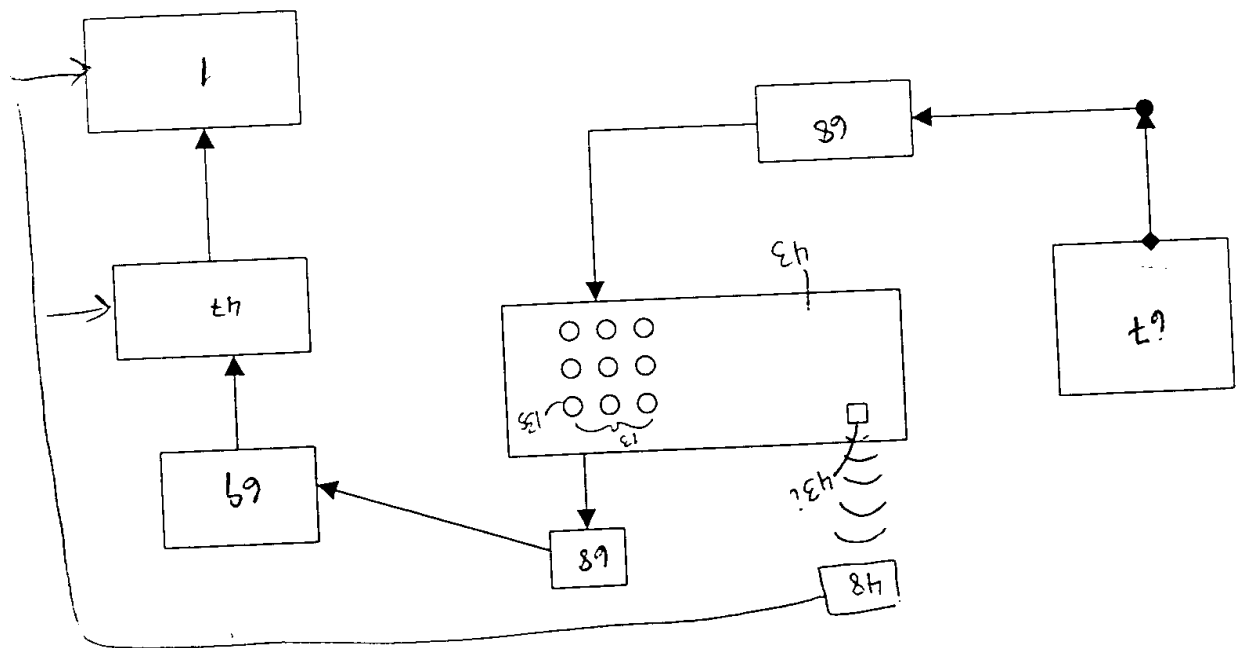
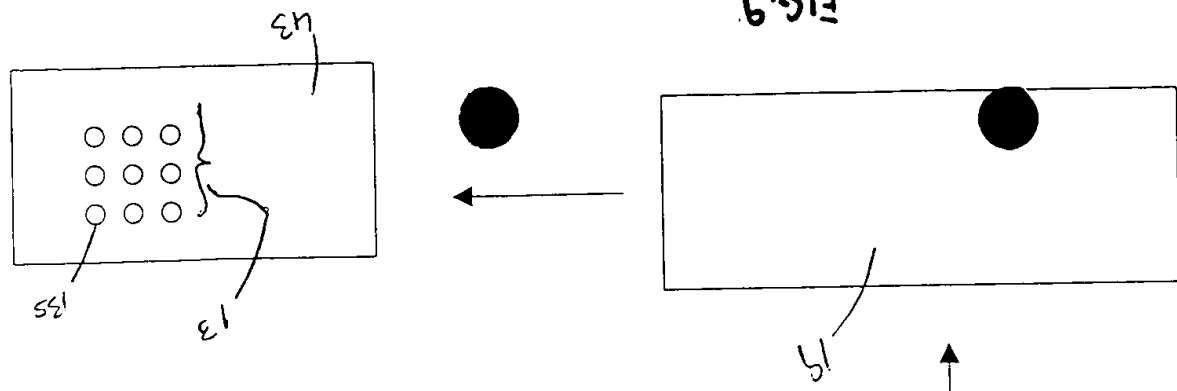


FIG. 9



Order Form

Tissue Type

brain ☒ 18
lung ☐ 20
heart ☐
liver ☐
spleen ☐
pancreas ☐
stomach ☐
colon ☐
kidney ☐
ureter ☐
urethra ☐
prostate ☐
ovaries ☐
testes ☐
eyes ☐
tongue ☐
trachea ☐
skin ☐

Other parameters

Cerebellum ☒
medulla ☒
cortex ☒
normal ☒
cancer ☒
Parkinson's disease ☐
Canavan's disease ☐
ALS ☐

Billing Information

NAME >
TITLE >
COMPANY_NAME >
STREET_ADDRESS >
STATE_OR_PROVINCE >
POSTAL_CODE >
Method of Payment
Account No.
Title of Microarray
Delivery Date:
Accept

Submit

71

72

73

74

75

FIGURE 10

Microsoft Access - [Pathology H-0717-86 to H-0065-87] File Edit View Insert Format Records Tools Window Help

Pathology # H-0722-86
Climomix ID 000000006P
Age/D08 63
Sex M
Collection Date 4/30/86
Location Tissue processing area

Primary Diagnosis
Bladder tumor
Histology
grade 2 papillary transitional cell carcinoma showing at least superficial smooth muscle invasion and associated with mildly atypical

Sample Type
Amount
block
Chemotherapy, R.
Node Status
No Positive Node
CEA
NA

Chemotherapy
Radiation Therapy
Localized Radiation
Therapy, Pelvic
Cytom.
Methotrexate and
5FU

Save Record

Primary Site
Bladder
Medication
hydrochlorothiaz
Valium, Tylenol
Evidence
Grade 2
Surgical Resection
TNM Staging
T2N0M0
Surgical Biopsy
CA125
Progesterone
NA
Estrogen
NA

Tube Type
Freezer, paraffin
Con Medication
Valium, Tylenol
Evidence
Grade 2
Surgical Resection
Bladder
CA-15-3
Progesterone
NA
Estrogen
NA

Form View

Record: 14 of 31393
Climomix ID 6
And/MR Sav
Collection Date
Location

NUM

100

11B 160RE

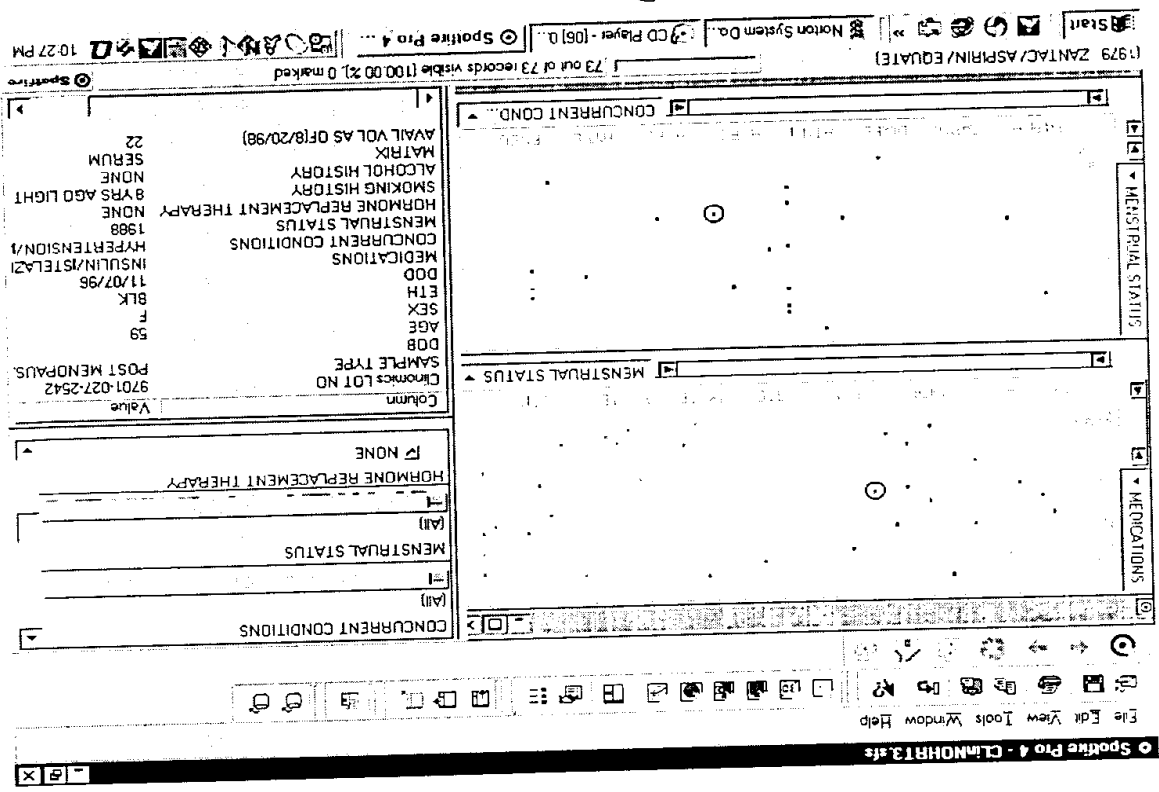
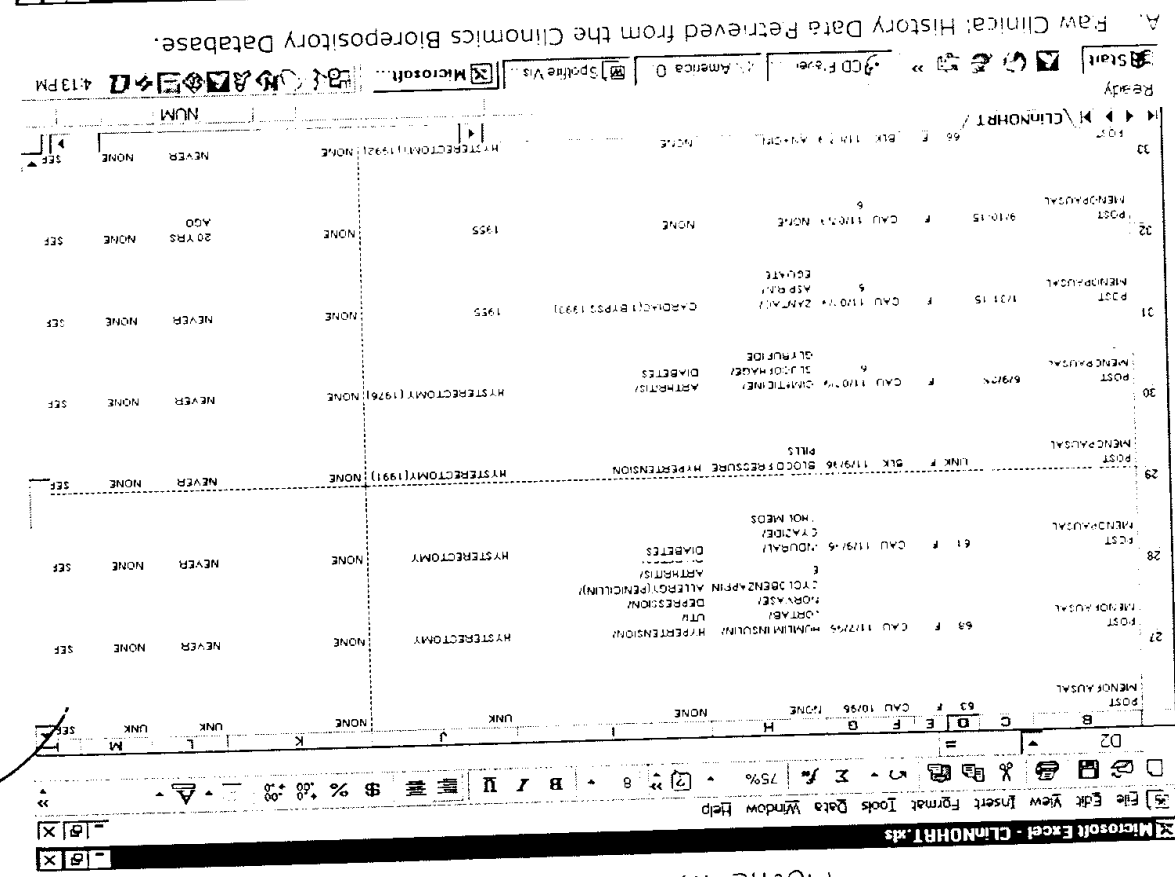
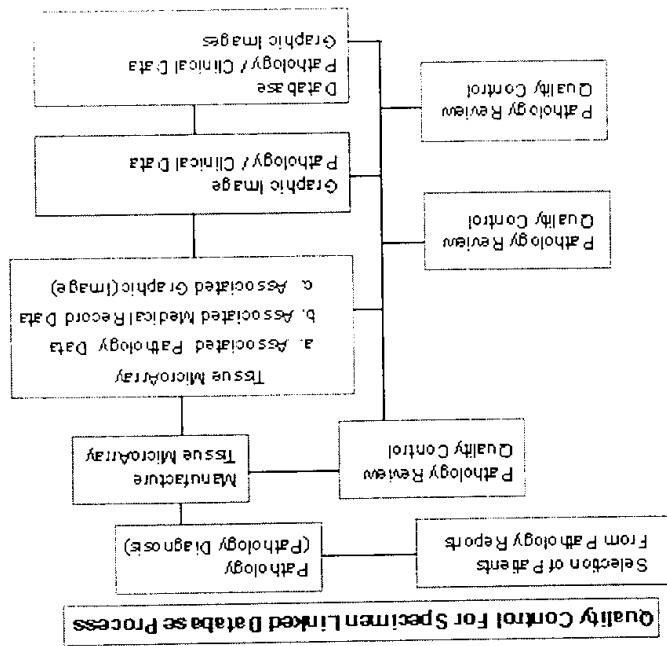


FIGURE 12



SNO-MED ANASITE NUMBERS		
1.02	SKIN	1.41 ARTERY, GENERAL
1.03	SUBCUTANEOUS TISSUE	1.42 AORTA
1.04	BREAST	1.43 CORONARY ARTERY
1.06	BONE MARROW	1.44 PULM. ARTERY
1.07	SPLEEN	1.45 VERT. CAROTID, CEREBR. TEMPOR.
1.08	LYMPH NODES	1.46 ILIAC, RENAL, MESENTERIC ARTERY
1.09	LYMPHATICS	1.47 POPLITEAL ARTERY
1.11	BONE	1.48 VEIN
1.12	SYNOVIAL JOINT	1.49 VEIN
1.13	MUSCLE	1.50 DIGESTIVE SYSTEM
1.15	CARTILADGE	1.51 MOUTH, PALATE, ORAL
1.16	BURSA	1.52 LIP
1.17	TENDON	1.53 TONGUE
1.18	LIGAMENT, FASCIA	1.54 GUM, TOOTH, GINGIVA
1.19	SOFT TISSUE	1.55 PAROTID, SALIV. GLND
1.21	NOSE	1.56 LIVER
1.22	SINUS, ACCESSORY	1.57 GALLBLADDER
1.23	NASOPHARYNX	1.58 EXTRAHEPATIC BILE DUCT
1.24	VOC. CORD, LARY. EPIGLT	1.59 PANCREAS
1.25	TRACHEA	1.60 PHARYNX
1.26	BRONCHUS	1.61 TONSIL, ADENOIDS
1.27	BRONCHIOLE	1.62 ESOPHAGUS
1.28	LUNG	1.63 CEMENTUM, STOMACH, PYLORUS
1.29	PLEURA	1.64 SM. INTEST. DUODENUM
1.30	CARDIO VAS SYS	1.65 JEJUNUM, ILEUM
1.31	PERICARDIUM	1.66 APPENDIX
1.32	HEART	1.67 COLON, MESENTERY
1.33	MYOCARDIUM	1.68 RECTUM
1.34	ENDOCARDIUM	1.69 ANUS
1.35	CARDIAC VALVE	1.71 KIDNEY
1.36	TRICUSPID VALVE	1.72 PENAL PELVIS, COCCYX
1.37	PULMONIC VALVE	1.73 URETER
1.38	MITRIAL VALVE	1.74 BLADDER
1.39	AORTIC VALVE	1.75 URETHRA
1.40	BLOOD VESSELS	1.76 PENIS
1.71	TRUNK, PERINEUM	1.77 PROSTATE
1.72	THORACIC DIAPHRAGM	1.78 TESTES, TUNICA VAGINALIS
1.73	THORACIC VISCERA	1.79 SCROTUM, SPERM CORD
1.74	ABDOMEN, PERITONEUM	1.80 EPIIDYMIIS, VAS DEF
1.76	RETROPERITONEUM	1.81 VULVA, LABIUM, CLITORIS
1.77	PERITONEAL FLUID	1.82 BARTHOOLINS GLAND
1.78	SYNOVIAL FLUID	1.83 VAGINA, HYMEN
1.79	UTERUS	1.84 ENDOMETRIUM
1.80	CERVIX	1.85 MYOMETRIUM
1.81	LOWER RESP. FLDS	1.86 FALLOPIAN TUBE
1.82	UPPER RESP. FLDS	1.87 OVARY
1.83	GI FLDS, SPACES	1.88 PLACENTA, UMBILICORD
1.84	GI CONTENTS	1.89 FETUS
1.85	URINE TRA. FLD. SPACE	1.90 PITUITARY
1.86	MALE GENT FLD. SPACE	1.91 ADRENAL
1.87	FEM. GENT FLD. SPACE	1.92 THYROID
1.88	PLACENTA, FETAL FLD	1.93 PARATHYROID
1.89	NERVOUS SYSTEM	1.94 THYMUS
1.90	BODY AS A WHOLE	1.95 ISLET OF LANGERHANS
1.91		1.96 BLOOD
1.92		1.97 FIBRO. ADIPOSE TISSUE
1.93		1.98 CONNECTIVE TISSUE
1.94		1.99 UPPER EXTREM.
1.95		1.98 LOWER EXTREM.
1.96		1.97 EAR
1.97		1.96 EYE
1.98		1.95 INTRACRAN. MENINGES
1.99		1.94 CSF, DURAL VENTRIC SYS
1.99		1.93 CEREBRAL BRAIN
1.99		1.92 CORPUS CALLOSUM
1.99		1.91 BASAL GANGLIA
1.99		1.90 THALAMUS
1.99		1.89 PONS, MIDBRAIN
1.99		1.88 CEREBELLUM
1.99		1.87 SPINAL CORD
1.99		1.86 CRANIAL NERVE, OPTIC
1.99		1.85 NERVE, VAGUS NERVE
1.99		1.84 SCALP, ORBITAL

SNO-MED ANASITE NUMBERS

SNO-MED DIAGNOSIS NUMBERS CARCINOM

M 8143	ADENOCARCINOMA
M 8233	ADENOCARCINOMA, ANAPLASTIC
M 8313	ADENOCARCINOMA, CLEAR CELL
M 8483	ADENOCARCINOMA, COLLOID
M 8443	ADENOCARCINOMA, CYSTIC
M 8563	ADENOSQUAMOUS CARCINOMA
M 8142	ADENOCARCINOMA, IN-SITU
M 8473	ADENOCARCINOMA, MUCINOUS CYST
M 8263	ADENOCARCINOMA, PAPILLARY
M 8233	ADENOCARCINOMA, UNDIFFER.
M 8493	ADENOCARCINOMA, SIGNET RING
M 8630	ARRHENBLASTOMA
M 8003	ANAPLASTIC MALIGNANCY
M 9403	ASTROCYTOMA, GRADE 1
M 9433	ASTROCYTOMA, GRADE 2
M 9443	ASTROCYTOMA, GRADE 3 & 4
M 8393	ADNEXAL CARCINOMA
M 8023	ANAPLASTIC CARCINOMA
M 8203	ADENOID CYSTIC CARCINOMA
M 9310	ADAMANTINOMA
M 8253	ALVEOLAR CARCINOMA
M 8001	ACINAR TUMOR
M 8553	ACINAR CARCINOMA
M 8093	BASAL CELL CARCINOMA
M 8253	BRONCHIOLAR CARCINOMA
M 8123	BASALOID TRANSITIONAL CARCINOMA
M 8090	BASAL CELL EPITHELIOMA
M 8013	CARCINOMA
M 8483	CARCINOMA, COLLOID
M 8012	CARCINOMA, IN-SITU
M 8053	CARCINOMA, PAPILLARY
M 8043	CARCINOMA, SMALL CELL
M 8983	CARCINOSARCOMA
M 8243	CARCINOID, MALIGNANT TUMOR
M 8023	CARCINOMA, UNDIFFERENTIATED METS
M 8023	CARCINOMA, UNDIFFERENTIATED
M 9103	CHORIOCARCINOMA
M 8241	CARCINOID TUMOR
M 8163	CHOLANGIOCARCINOMA
M 9223	CHONDROSARCOMA
M 9230	CHONDROBLASTOMA
M 9351	CRANIOPHARYNGIOMA
M 8203	CYLINDROMA
M 8463	CYSTADENOCARCINOMA PAPILLARY SEROUS
M 8453	CYSTADENOCARCINOMA, PAPILLARY
M 8823	DERMATOFIBROSARCOMA
M 7600	DYSPLASIA
M 8503	DUCTAL, INFILTRATING CARCINOMA
M 9391	EPENDYMOOMA

FIGURE 14B

M.8073	EPIDERMOID CARCINOMA
M.9073	EMBRYONAL CELL CARCINOMA
M.8110	EPITHELIOMA
M.9263	EWINGS SARCOMA
M.8823	FIBROSARCOMA
M.8333	FOLLICULAR CARCINOMA
M.8803	GIANT CELL SARCOMA
M.9040	GIANT CELL TUMOR
M.8621	GRANULOSA CELL TUMOR
M.9443	GLIOBLASTOMA, MULTIFORME
M.9383	GLIOMA
M.8033	GIANT CELL CARCINOMA
M.9161	HEMANGIOBLASTOMA
M.8973	HEPATOBLASTOMA
M.8830	HISTOCYTOMA
M.9653	HODGKINS
M.9683	HODGKINS SARCOMA
M.8363	HURTLER CELL CARCINOMA
M.8153	ISLET CELL CARCINOMA
M.9143	KAPOSI SARCOMA
M.9865	LEUKEMIA, ACUTE MYELOGENOUS
M.9826	LEUKEMIA, LYMPHOMA
M.9807	LEUKEMIA
M.9827	LEUKEMIA, CHRONIC LYMPHOMA
M.8893	LEIOMYOSARCOMA
M.9633	LYMPHOMA, LYMPHOCYTIC
M.9593	LYMPHOMA, LYMPHOCYTIC
M.9693	LYMPHOMA, GIANT FOLLICULAR
M.9623	LYMPHOMA, LYMPHOCYTIC
M.9593	LYMPHOMA, MALIGNANT
M.9643	LYMPHOMA, HISTIOCYTIC
M.8083	LYMPHEPITHELIOMA
M.9703	LYMPHOMA, T-CELL
M.8853	LYMPHOSARCOMA, LYMPHOCYTIC
M.9603	LYMPHOMA, STEM CELL
M.8773	MALIGNANT MELANOMA SPINDLE CELL
M.9530	MENINGIOMA
M.8016	METASTATIC CARCINOMA
M.8003	MALIGNANT TUMOR
M.8006	METASTATIC MALIGNANT TUMOR
M.9473	MEDULLOBLASTOMA
M.8723	MALIGNANT MELANOMA
M.6972	MALIGNANT CELLS
M.9370	MYOBLASTOMA
M.8433	MUCOEPIDERMOID CARCINOMA
M.8243	MALIGNANT CARCINOID TUMOR
M.8993	MALIGNANT MESENCHYOMA
M.9051	MESOTHELIOMA
M.9733	MYELOMA
M.8733	METASTATIC MELANOMA

FIGURE 14C

M.8623	MALIGNANT GRANULOSA CELL TUMOR
M.8703	MALIGNANT PHEOCHROMOCYTOMA
M.9053	MALIGNANT MESOTHELIOMA
M.8893	METASTATIC LEIOMYOSARCOMA
M.8953	MESODERMAL TUMOR
M.8940	MIXED TUMOR
M.9503	NEUROBLASTOMA, NEUROEPITHELIOMA
M.5443	NECROTIC TUMOR
M.9503	NEUROBLASTOMA, NEUROEPITHELIOMA
M.9453	OLIGODENDROGLIOMA
M.8043	OAT CELL CARCINOMA
M.9200	OSTEOBLASTOMA
M.9180	OSTEOMA
M.9183	OSTEOSARCOMA
M.9190	OSTEOIDOSTEOMA
M.9210	OSTEOCHONDROMA
M.8053	PAPILLARY CARCINOMA
M.9733	PLASMA CELL MYELOMA
M.8463	PAPILLARY METASTATIC CYTADENOCARCINOMA
M.8133	PAPILLARY TRANSITIONAL CELL CARCINOMA
M.2485	RENAL CELL CARCINOMA
M.9643	RETICULUM CELL SARCOMA
M.8313	RENAL CLEAR CELL CARCINOMA
M.8073	SQUAMOUS CELL CARCINOMA
M.8316	SARCOMA, RETICULAR CELL
M.8070	SQUAMOUS EPITHELIAL TUMOR
M.8072	SQUAMOUS CELL CARCINOMA IN-SITU
M.8803	SARCOMA, UNDIFFERENTIATED GIANT CELL
M.9643	SARCOMA, RETICULAR CELL
M.8033	SPINDLE CELL CARCINOMA
M.9063	SEMINOMA
M.8933	STROMAL SARCOMA
M.8001	TUMOR
M.8043	TUMORLET
M.8583	THYROMA MALIGNANT
M.8123	TRANSITIONAL CELL CARCINOMA
M.9081	TERATOMA
M.8053	VERRUCOUS SQUAMOUS CARCINOMA

FIGURE 15

BRAIN INVENTORY CLASSIFICATIONS									
PATHOLOGY	TISSUE	DOB	AGE	SEX	MEDICAL HISTORY	ICD-9-CM DSM-IV-T	291.89	N/A	MEDICATIONS
AU-99-47	Brain	04/08/1961	36	M	Multiple traumatic injuries sustained in a motor vehicle accident. Open skull fractures				
					brain contusions		851.80		
					subarachnoid hemorrhage		852.00		
					pericardial tear		860.0		
					bilateral pneumothoraces, contusions of heart				
					Blood alcohol level 95 mg/dl				
AU-99-61	Brain	04/26/1972	27	F	Pregnancy induced hypertension		401.9	293.83	Betamethasone
					Thyroiditis		245.9		Magnesium sulfate
					Asthma		493.90		Pseudo
					Severe pre-eclampsia		642.0		Apixidine
					Anoxic encephalopathy		437.2		Munitol
					Intracerebral hemorrhage		431		
					Hemorrhage of right putamen				
					Hypertensive cerebral edema		348.5		
					Diffuse anoxic changes				
AU-99-80	Brain	12/27/1947	52	F	Breast cancer		174.9	293.83	N/A
					Idiopathic cardiomyopathy		425.40		
					Chronic congestive heart failure		428.00		
					Anaphylactic shock secondary to Taxol administration				
					Severe hypoxia and brain death				
AU-99-82	Brain	08/05/1957	42	M	Chronic pain		307.89	307.89	N/A
					Drug abuse		305.90		
					Severe coronary artery sclerosis		414.00		
					Old myocardial infarction				
					Cardiomegaly				
AU-99-84	Brain	05/10/1960	39	F	Severe chronic alcoholism			281.89	N/A
					Previous hospital admission for alcohol intoxication and major depression				
					Severe ascites (4,000 ml)				
					Hepatomegaly (liver 1,690gm)				
					Severe cirrhosis				
AU-99-90	Brain	04/19/1962	37	M	Multiple traumatic injuries sustained in a motor vehicle accident. Avulsion of soft tissue, bone and brain.				
					Multiple comminuted open fractures of the skull				
					Alcohol intoxication				
					Blood ethanol level .252 gm %				
AU-99-91	Brain	01/09/2028	71	M	Prostate cancer		185	293.83	N/A
					Squamous cell cancer of lung		162.9		
					Ventricular peritoneal shunt secondary to progressive hydrocephalus from brain mass				
					Headaches				
					Unsteady gait				
					Mental confusion				
					Mets squamous cell cancer to liver, spleen, kidneys, and brain.				
					Emphysema				
					Atherosclerosis of coronary arteries				
AU-99-93	Brain	05/01/1958	41	M	Morbid obesity		278.00	303.00	Orphenadrine, Naproxen
					Hypertension		401.9	291.89	
					Gout		274.9		
					Chronic pain syndrome				
					Depression				
					Acute myocardial infarction				
					Acute alcohol intoxication				
					Cardiac hypertrophy				
					Micronodular cirrhosis				
AU-99-94	Brain	#####	50	F	Ethanol abuse		401.9	305.00	
					Hypertension				
					Elevated liver enzymes				
					Micronodular cirrhosis				
					Severe ascites (5 l)				
					Splenomegaly				
					Emphysema				